SONY

Camera Control Unit

Model:

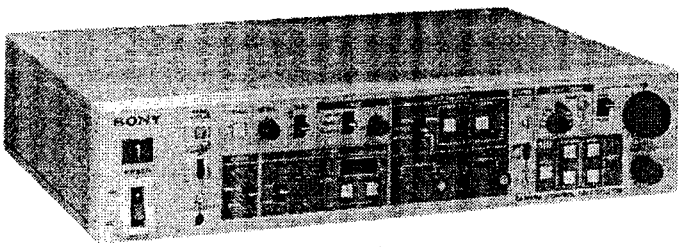
CCU-M5/M5P

Operating Instructions page 3

Before operating the unit, please read this manual thoroughly and retain it for future reference.

Mode d'emploi page 45

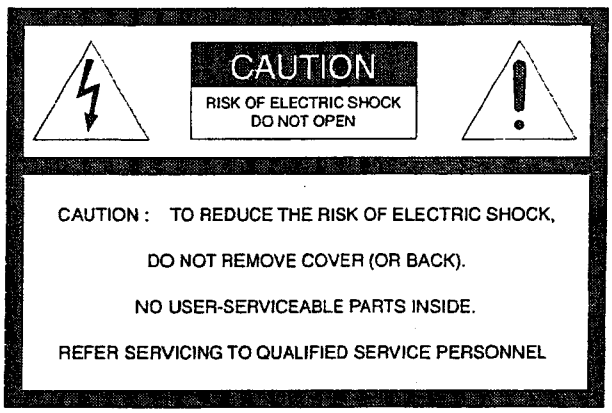
Avant la mise en service de cet appareil, priére de lire attentivement ce mode d'emploi que l'on conservera pour toute référence ultérieure.



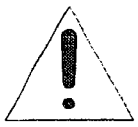
WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION : TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Owner's Record

The model and serial numbers are located on the rear panel. Record these numbers in the spaces provided below. Refer to them whenever you call your Sony dealer regarding this product.

Model No. CCU-M5/M5P Serial No._____

For the customers in the USA
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC rules.

For the customers in Canada
This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

Pour les utilisateurs au Canada
Cet appareil est conforme aux normes Classe A pour bruits radioélectriques, spécifiés dans le Règlement sur le brouillage radioélectrique.

WARNING FOR THE CUSTOMERS IN THE UNITED KINGDOM
THIS APPARATUS MUST BE EARTHED.

IMPORTANT
The wires in this mains lead are coloured in accordance with the following code:

Green-and-yellow:	Earth (Safety earth)
Blue:	Neutral
Brown:	Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows: The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured green or green-and-yellow.
The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

Table of Contents

Overview **4**
Features 4
System Examples 6
Functions Using the CCU-M5/M5P 7

Location and Function of Parts **9**
Front Panel 9
Rear Panel 14

Preparations **16**
Precautions 16
Rack Mounting 17
How to Use the Stands 17
Connections 18

Basic Operation **24**
Standard Settings and Operation 24
Communication with a Camera Operator or Control Console Operator 26
Tally lamp 27
Return Video 27

Adjustments **28**
Adjusting a Video Monitor 28
Adjusting Black Balance and White Balance 29
Adjusting the Iris 32
Adjusting the Video Output Level 33
Adjusting the Master Pedestal Level 33
Adjusting the Details 34
Adjusting the SC and H Phases 34
Adjusting the Knee 36
Selecting the Shutter Speed 37
Decreasing Slant Noise from a Computer Screen (Clear Scan Function) 38
Compensating for the Cable Length 39
Auxiliary Operation 41

Specifications **43**
Recommended Equipment 44

Overview

The CCU-M5/M5P is a camera control unit designed for the Sony video cameras such as the DXC-325/325P, DXC-327/327P, DXC-327A/327AP, DXC-537/537P, DXC-930/930P, DXC-3000A/3000AP, or DXC-M7/M7P. Various adjustment functions of the camera can be remotely controlled from a location 300 meters apart in maximum with this unit. It is especially convenient for program production using a recording system with two or more video cameras.

Features

Remote control capability for various adjustments

The unit allows remote control of the adjustments required for camera recording, such as automatic and manual adjustments of white balance, such as automatic and manual adjustments of white balance, black balance and lens iris, gain selection of the video amplifier and pedestal level control, etc. Also the knee adjustment function provide high-quality pictures under various shooting conditions.

Connections with various types of cameras and video equipment

Besides the output for the conventional composite video signal (VBS), this unit is equipped with outputs for a component video signal and S-video signal to provide superior picture quality corresponding to many picture systems. Also, the RGB signal outputs allow a chroma keyer and an RGB monitor to be connected. For connecting a video camera, two types of connectors, 14 pin and 26 pin, are included for various types of cameras.

Gen-lock function

The gen-lock function enables video cameras to be synchronized with an external reference signal. When using multiple video cameras, all the cameras can be synchronized with the same reference signal. The SC and H phase differences between the gen-lock reference signal and the output signal can be adjusted.

Built-in cable compensator

This unit can compensate for the transmission loss from high-frequency components and the output level decrease caused by camera cable extensions up to 300 m. The compensation level for composite video signals (VBS) can be independently fine-adjusted for the luminance signal and the chrominance signal.

Return video

The return video signals from a special effects generator or a control console can be monitored in the viewfinder of a camera.

Tally/intercom function

Communication among the operators of this CCU, the video camera and the control console is supported by the tally/intercom functions. This unit is equipped with two tally intercom connectors to accept various intercom systems.

Detail correction

Thanks to the built-in detail correction circuit, the contours of objects can be sharpened or softened as desired.

Clear Scan™ function (available on the DXC-930/930P only)

The Clear Scan function decreases the slant noise when you are shooting a computer screen using a video camera.

Built-in electric shutter control

The built-in shutter controller enables the unit to produce clear images even when objects are moving at very high speeds. By selecting an appropriate shutter speed, clear still pictures and slow motion pictures can be obtained on playback.

Character display functions

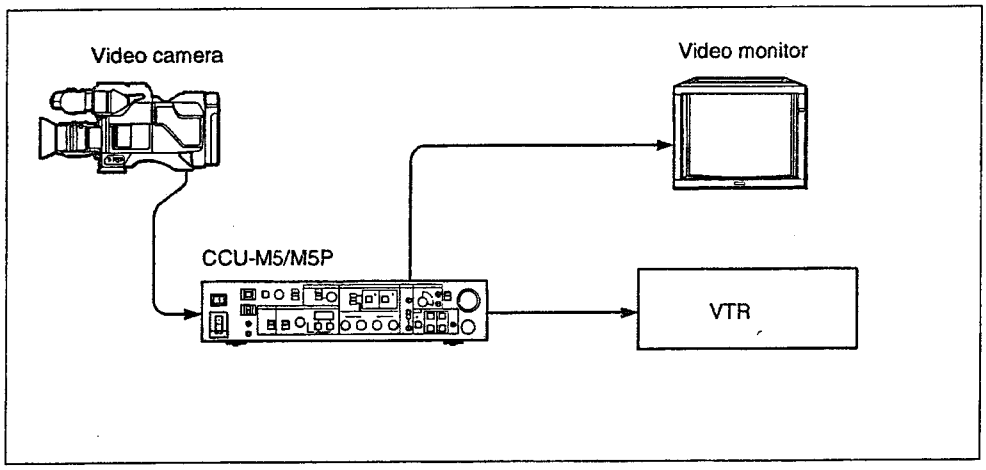
Using the character display functions, the adjustment items and their current values are displayed on the monitor screen.

Rack mounting

The unit can be mounted in a 19-inch standard rack.

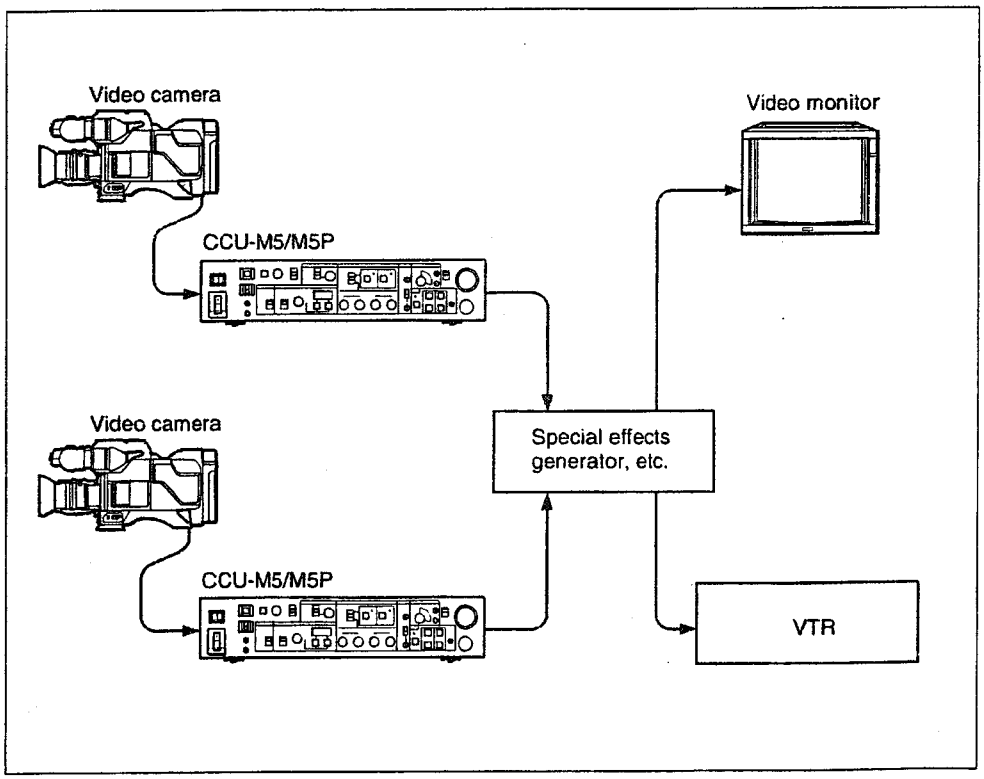
System Examples

System controlling a single camera



System controlling a single camera

System for controlling two or more cameras



System for controlling two or more cameras

Functions Using the CCU-M5/M5P

Output signals

Output signals

Camera or camera and camera adaptor	Output signal			
	VBS	RGB	S-video	Y/R-Y/B-Y
DXC-537/537P with CA-537/537P	Yes	Yes	Yes	Yes
DXC-327A/327AP with CA-537/537P	Yes	Yes	Yes	Yes
DXC-M7/M7P	Yes	Yes	Yes	Yes
DXC-537/537P with CA-327/327P	Yes	Yes	No	No
DXC-327/327P/327A/327AP with CA-327/327P	Yes	Yes	No	No
DXC-325/325P with CA-325/325P	Yes	Yes	No	No
DXC-3000A/3000AP	Yes	Yes	No	No
DXC-930/930P	Yes	Yes[a)]	Yes[b)]	No

a) When the CCTZ-3RGB or CCTQ-3RGB camera cable is used.
b) When the CCTZ-3YC camera cable is connected.

Items that may be adjusted

Adjustable items

Cameras	Items to be adjusted			
	Detail	Shutter speed	Clear scan	Knee point
DXC-537/537P	Yes	Yes	No[a)]	No[b)]
DXC-327A/327AP	Yes	Yes	No	No[b)]
DXC-327/327P	Yes	Yes	No	No[b)]
DXC-M7/M7P	Yes	Yes	No	Yes
DXC-325/325P	No	No[a)]	No	No
DXC-3000A/3000AP	No	No	No	No
DXC-930/930P	Yes	Yes	Yes	No

a) This function can be controlled on the camera.
b) The figures displayed on the monitor screen chang but adjustments cannot be made.

Length of camera cables

When the CCZ-An camera cable is used

When an optional CCZ-An (n means the cable length) camera cable is used, the cable can be extended up to 300 meters (999 feet). How much the cable length can be extended depends on the equipment used in combination and the type of a cable. To extend the cable, set the CABLE COMP switch to the appropriate position according to the length of the cable to be used.

To supply power to the camera from the CCU-M5/M5P:

When the CCZ-An camera cable is used and the power is supplied through the CCU, the maximum cable length is as shown in the table below.

Maximum cable length

Viewfinder	Video camera			
	DXC-537/ 537P	DXC-327A/ 327AP	DXC-M7/ M7P	DXC-930/ 930P
DXF-40A/40ACE/50/50CE	150 m	150 m	100 m	—
DXF-325/325CE/501/501CE, DXF-M7/M7CE	200 m	200 m	150 m	—
Not used	250 m	250 m	150 m	300 m

To supply power to the camera from an independent power source:

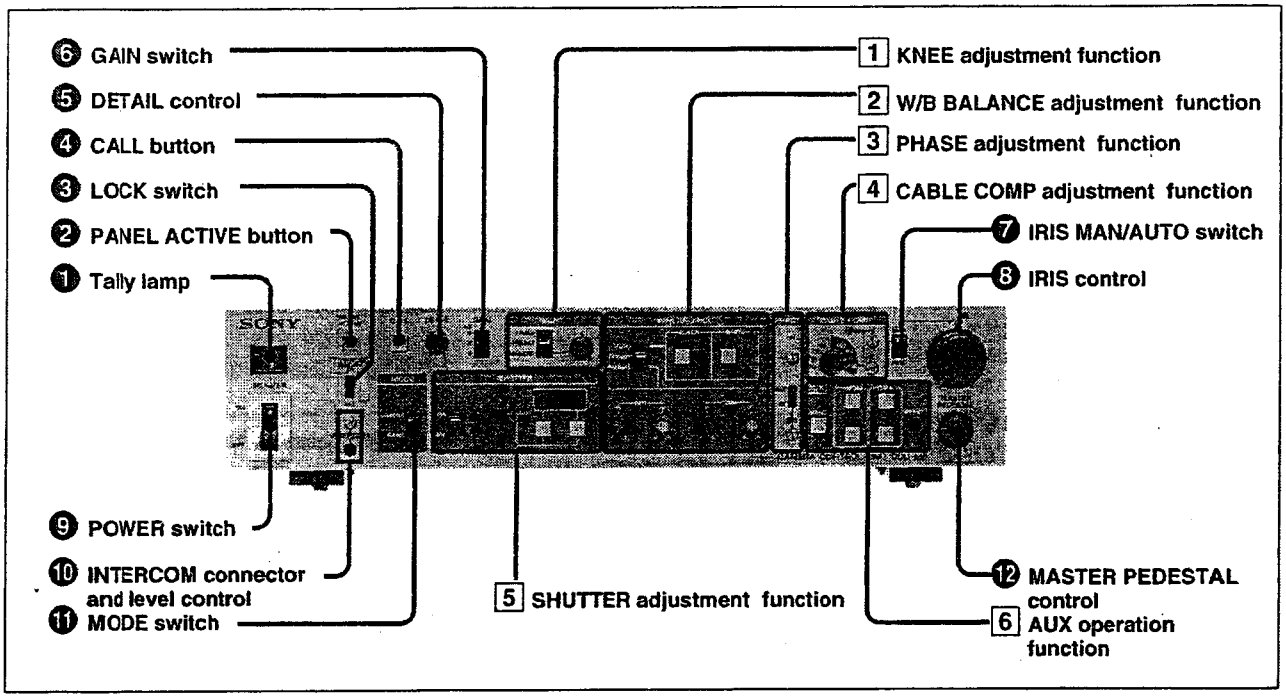
When the CCZ-An camera cable is used and the power is supplied from separate power source, the camera cable can be extended up to 300 meters.

When the CCQ-nAM camera cable is used

When the CCQ-nAM camera cable is used, the maximum cable length is 100 meters.

Location and Function of Parts

Front Panel



Front panel

❶ Tally lamp

This lamp lights up when the video camera connected to this unit is selected on the control console or the SEG-2550A/2550AP special effects generator, indicating that what the camera is shooting is being recorded. This lamp also lights up when the CALL button on the camera or CCU is pressed.

The indication number on the lamp can be changed by using the supplied sheets.

❷ PANEL ACTIVE button

When the video camera connected to this unit is controlled by multiple devices such as the RM-M7G remote control unit, press this button so that it lights, enabling this unit to control the camera. While this button is lit, the control-panel switches, buttons and control knobs of this unit are operative.

When the PANEL ACTIVE button of another device is pressed, the light of the button of this unit goes out and the unit's control over the camera is canceled.

❸ LOCK switch

ON: The settings of the switches, buttons and control knobs on the panel except the CALL button, INTERCOM control and CABLE COMP FINE controls are maintained. This prevents the settings from being changed inadvertently after the adjustments are completed.

OFF: Normally set to this position. The video camera can be controlled by this unit.

❹ CALL button

Press this button to call the camera operator. While this button is pressed, the tally lamps in the camera's viewfinder and on this unit will light.

❺ DETAIL control

This control compensates the contours of objects. Turn the control to obtain the desired contours.

❻ GAIN switch

This switch selects the amplification gain of the video signal.

Normally set the gain to 0 dB. When the lighting on subjects is low, set the switch to 9 dB or 18 dB.

⑦ IRIS MAN/AUTO switch

This switch selects the iris control mode, manual or automatic when the IRIS select switch on the lens is set to AUTO.

MAN: The iris can be manually adjusted with the IRIS control ⑧. For manual adjustment, set the IRIS selector on the camera.

AUTO: The iris is automatically adjusted to the optimum value.

⑧ IRIS control

This control adjusts the iris when the IRIS MAN/AUTO switch ⑦ is set to MAN. The iris can be adjusted continuously over the full range from "open" to "close."

When the IRIS MAN/AUTO switch is set to AUTO, this control performs fine adjustment of the automatically-adjusted iris.

⑨ POWER switch

ON: When the ON side is pressed, the power is turned on.

OFF: When the OFF side is pressed, the power is turned off.

⑩ INTERCOM connector (minijack) and level control

Connect a headset such as a DR-100A to this connector. Then the CCU operator can talk to the camera operator or the control console operator. The sound volume of the headset can be adjusted by turning the control with a small screwdriver.

⑪ MODE switch

This switch selects the signal to be output from this unit.

CAMERA: To output the signal from the camera

BARS: To output the color-bar signal

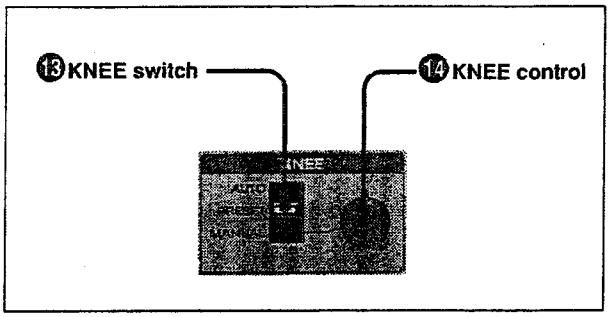
⑫ MASTER PEDESTAL control

This control adjusts the pedestal level (black level) of the video signal.

[1] KNEE adjustment function

Note

The KNEE adjustment function is enabled only when the DXC-M7/M7P is connected.



KNEE adjustment function

⑬ KNEE switch

AUTO: The auto knee circuit is activated. The circuit automatically adjusts the knee point to the optimum level to avoid clipping of bright parts under bright lighting.

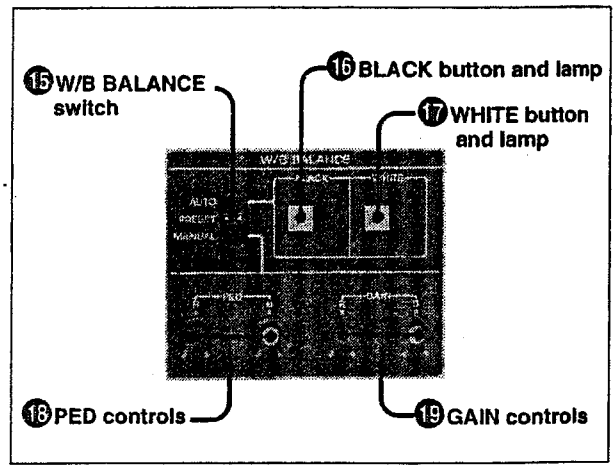
PRESET: The knee circuit works for the preset knee point.

MANUAL: The knee point can be adjusted manually by using the KNEE control ⑭.

⑭ KNEE control

This control is activated when the KNEE switch ⑬ is set to MANUAL, enabling manual adjustment of the knee point.

[2] W/B BALANCE adjustment function



W/B BALANCE adjustment function

⓯ W/B BALANCE (white balance and black balance) switch

AUTO: White balance and black balance are automatically adjusted with the WHITE button ⓱ and BLACK button ⓰. The adjusted values are stored in the memory in the camera head. The stored values are retrieved automatically when the switch is set to this position, and the camera operates.

PRESET: The camera operates with the preset values, i.e., white balance adjusted for iodine lamps (color temperature 3200K) with the FILTER selector of the camera set to 1. When there is no time to adjust the white balance, set the switch to this position.

MANUAL: White balance and black balance can be manually adjusted with the GAIN controls ⓳ and PED controls ⓲.

⓰ BLACK (black balance adjustment) button and lamp

For automatic black balance adjustment, push this button after setting the W/B BALANCE switch ⓯ to AUTO or PRESET. When the adjustment is completed, the lamp lights and it goes out after about five seconds.

⓱ WHITE (white balance adjustment) button and lamp

For automatic white balance adjustment, push this button after setting the W/B BALANCE switch ⓯ to AUTO. When the adjustment is completed, the lamp lights and it goes out after about five seconds.

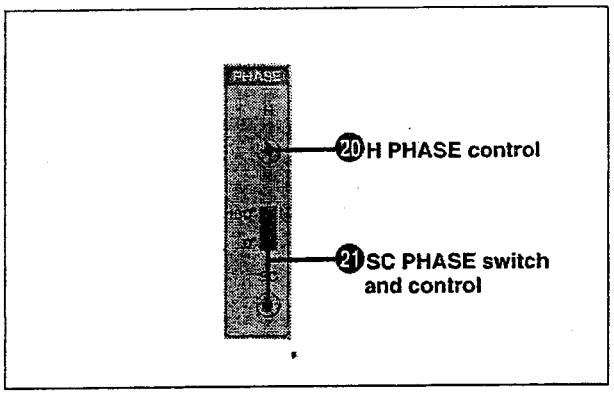
⓲ PED (pedestal level) controls

These controls manually adjust the pedestal level when the W/B BALANCE switch ⓯ is set to MANUAL. The R control adjusts the red component and the B control adjusts the blue component.

⓳ GAIN (video gain) controls

These controls manually adjust the video output level when the W/B BALANCE switch ⓯ is set to MANUAL. The R control adjusts the red component and the B control adjusts the blue component.

3 PHASE adjustment function



PHASE adjustment function

⓴ H PHASE (horizontal phase) control

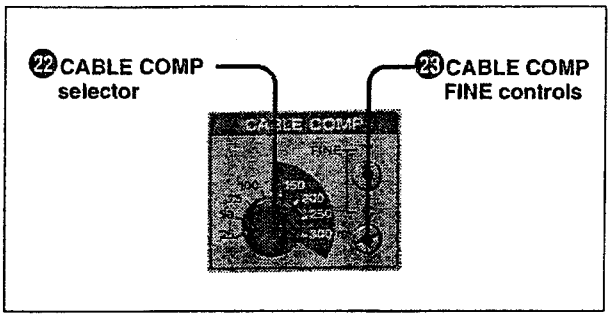
This control adjusts the horizontal phase difference between the external sync signal and the output signal.

㉑ SC PHASE (subcarrier phase) switch and control

This switch and control adjust the subcarrier phase difference between the external sync signal and the output signal.

Set the switch to the appropriate position, then turn the control with a screwdriver for fine adjustment.

4 CABLE COMP adjustment function



CABLE COMP adjustment function

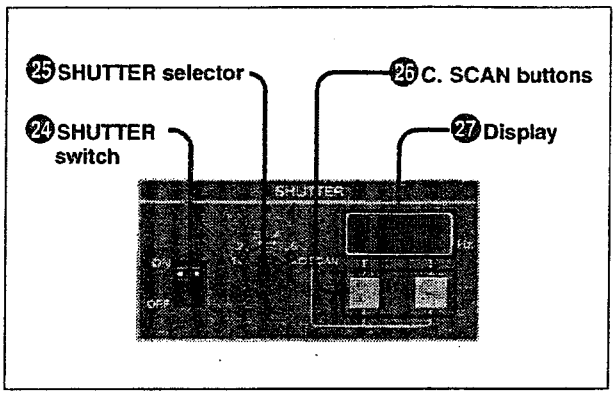
㉒ CABLE COMP (cable compensation) selector

Set this selector according to the length of the camera cable being used. The cable compensator performs compensation according to the selected cable length to eliminate signal degradation.

㉓ CABLE COMP FINE (cable compensation fine adjustment) controls

These controls are for fine adjustment of the cable compensation level of the video signal supplied from the VBS OUT connectors.
After setting the CABLE COMP selector ㉒ according to the length of the cable being used, turn these contols with a screwdriver if fine adjustment is required. The Y control adjusts the Y (luminance) signal level and the C control adjusts the C (chrominance) signal level.
Use a waveform monitor and a vectorscope when doing the adjustments.

5 SHUTTER adjustment function



SHUTTER adjustment function

㉔ SHUTTER switch

ON: The built-in electric shutter is activated.
OFF: The shutter is deactivated.

㉕ SHUTTER selector

When the built-in electric shutter is used, select the shutter speed with this selector.

SHUTTER selector setting

SHUTTER selector setting	Shutter speed
1	1/100 sec. for the NTSC model, 1/60 sec. for the PAL model
2	1/250 sec.
3	1/500 sec.
4	1/1000 sec.
5	1/2000 sec.
C. SCAN	To activate the Clear Scan function

㉖ C. SCAN (Clear Scan) buttons

When the SHUTTER selector ㉕ is set to C.SCAN, press these buttons to obtain the adjusted value for the least noise. The adjusted value appears on the display ㉗.

Note

The Clear Scan function is activated only when the DXC-930/930P is connected.

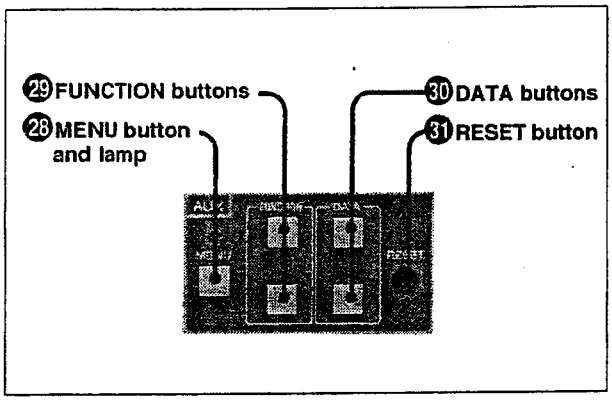
㉗ Display

The values set with the SHUTTER selector ㉕ and C.SCAN buttons ㉖ are displayed here. When the electric shutter is not used, OFF appears.

6 AUX operation function

Note

The FUNCTION, DATA and RESET buttons are activated only when the DXC-930/930P is connected.



AUX operation function

㉘ MENU button and lamp

When this button is pressed, the current settings on the front panel appear on the monitor screen connected to the MONITOR OUT connector. When this button is pressed again, the displayed characters disappear.

When the DXC-930/930P is connected, pressing this button lights the MENU lamp, and the items adjusted with the FUNCTION, DATA and RESET buttons appear on the monitor screen. Pressing this button again makes the MENU lamp go out, and the current settings on the front panel appears. To make the displayed characters disappear, press this button once more.

㉙ FUNCTION buttons

When these buttons are pressed, the arrow on the menu which appears by pressing the MENU button ㉘ moves up and down. Use this button to select the item to be adjusted.

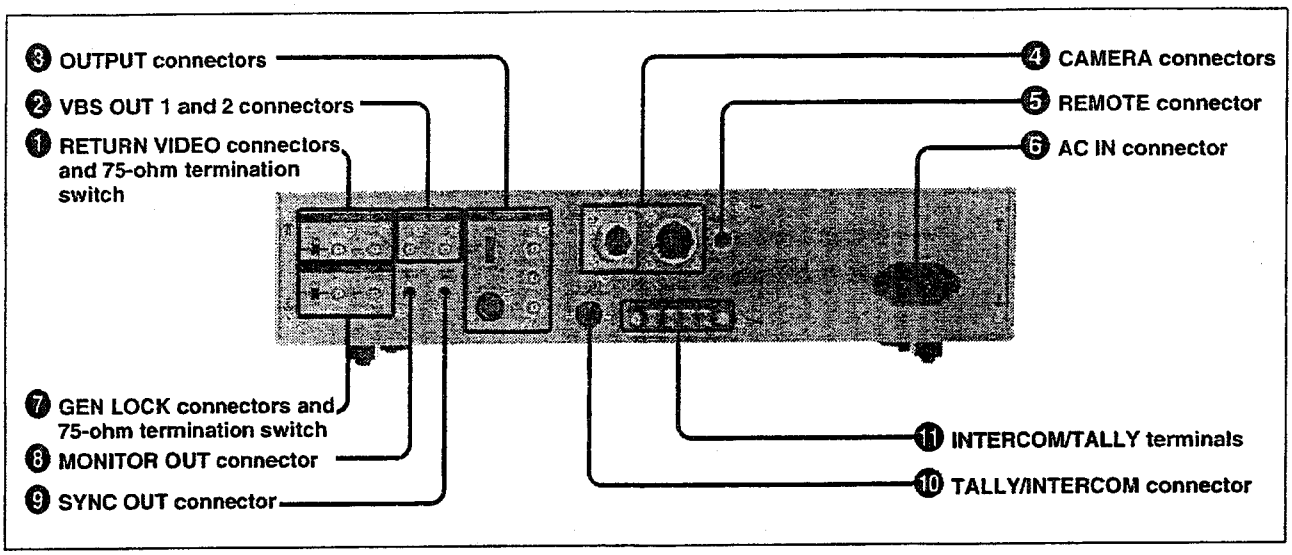
㉚ DATA buttons

When these buttons are pressed, the setting for the item selected with the FUNCTION button ㉙ changes.

㉛ RESET button

When this button is pressed, the settings on the menu are changed to the preset ones (the status set at the factory).

Rear Panel


❸ OUTPUT connectors
❷ VBS OUT 1 and 2 connectors
❶ RETURN VIDEO connectors and 75-ohm termination switch
❼ GEN LOCK connectors and 75-ohm termination switch
❽ MONITOR OUT connector
❾ SYNC OUT connector
❹ CAMERA connectors
❺ REMOTE connector
❻ AC IN connector
⓫ INTERCOM/TALLY terminals
❿ TALLY/INTERCOM connector

Rear panel

❶ RETURN VIDEO connectors (BNC type) and 75-ohm termination switch

These connectors accept the output signal from a control console or a special effects generator to feed the on-the-air signal or the signal being recorded to the viewfinder of the camera.

IN (input) connector

Connect to the program output connector of a control console or a special effects generator.

OUT (output) connector

The signal supplied to the IN connector is directly output from this connector. To feed the return video signal to another video unit, connect this connector to the return video input of the video unit.

75-ohm termination switch

When only the IN connector is used, set this switch to ON. When both the IN and OUT connectors are used, set it to OFF.

❷ VBS OUT (video signal output) 1 and 2 connectors (BNC type)

These connectors feed out composite video signals (VBS: Video, Burst, Sync). Connect to the video input connectors of video equipment such as a VTR or a special effects generator, etc.
The same signal is fed out from the both connectors.

❸ OUTPUT (video signal output) connectors

S VIDEO connector (mini DIN 4-pin)

This connector feeds out S video signals when the video output signal select switch is set to S VIDEO. Connect with a VTR or a video monitor which can process the S video signals.

R/R-Y, G/Y, B/B-Y connectors (BNC type)

These connectors feed out the R, G, B color signals or the R-Y, Y, B-Y component signals according to the setting of the video output signal select switch. Connect these connectors to the appropriate connectors of a VTR having input connectors for component signals.

Video output signal select switch

This switch selects the signals to be fed out from the OUTPUT connectors.

RGB: The R, G, B color signals are fed out from the R/R-Y, G/Y, B/B-Y connectors respectively.
The signal is not output from the S VIDEO connector.

R-Y/Y/B-Y: The R-Y, Y, B-Y component signals are fed out from the R/R-Y, G/Y, B/B-Y connectors respectively.
The signal is not output from the S VIDEO connector.

S VIDEO: The signal is fed out from the S VIDEO connector.
The signals are not output from the R/R-Y, G/Y, B/B-Y connectors.

❹ CAMERA connectors (Q-type14-pin, Z-type 26-pin)

Connect one of these connectors with a video camera. To connect a camera with the 14-pin connector, connect the 14-pin connector using the CCQ-AM camera cable: To connect a camera with the 26-pin connector, connect the 26-pin connector using the CCZ-A camera cable.

❺ REMOTE connector (10-pin)

Connect the RM-M7G remote control unit.

❻ AC IN connector

Connect to an AC power source using the supplied AC power cord.

❼ GEN LOCK connectors (BNC type) and 75-ohm termination switch

These connectors are for a sync signal.

IN (input) connector

This connector accepts a reference black burst signal or a composite video signal (VBS: Video, Burst, Sync) to synchronize the camera with an external sync signal.
When no signal is input to this connector, the video camera operates in the internal sync mode.

OUT (output) connector

The signal supplied to the IN connector is directly fed out from this connector. To synchronize another camera or video unit with the same reference signal, connect this connector to the reference signal input connector of that device.

75-ohm termination switch

When only the IN connector is used, set this switch to ON. When both the IN and OUT connectors are used, set it to OFF.

❽ MONITOR OUT connector (BNC type)

This connector feeds out the composite video signals to be monitored.
When the MENU button on the front panel is pressed, information dispalyed as characters on the setting status of the front panel can be added to the video signals. Connect to the video input connector on a video monitor.

❾ SYNC OUT (sync signal output) connector (BNC type)

This connector feeds out a sync signal from a camera. Connect to the sync signal input connector of an RGB monitor.

❿ TALLY/INTERCOM connector (DIN 4-pin)

Connect the tally/intercom signals to enable the CCU or control console operator and the camera operator to communicate with each other. Connect to the TALLY/INTERCOM connector on a control console or a special effects generator using a CCDD cable (optional).

⓫ INTERCOM/TALLY terminals (screw terminal)

Connect to an intercom system which cannot be connected to the TALLY/INTERCOM connector ❿.

Preparations

Precautions

On safety

- Operate the unit only with a power source specified in the "Specifications" section.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.

On installation

- Allow adequate air circulation to prevent internal heat buildup.
- Do not install the unit near a heat source such as a radiator or an air duct, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Keep the unit away from equipment with strong magnets as for example a large speaker.

On operation

When the unit is not in use, turn the power off.

On cleaning

Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution.
Do not use any type of solvent, such as alcohol or benzine, which might damage the finish.

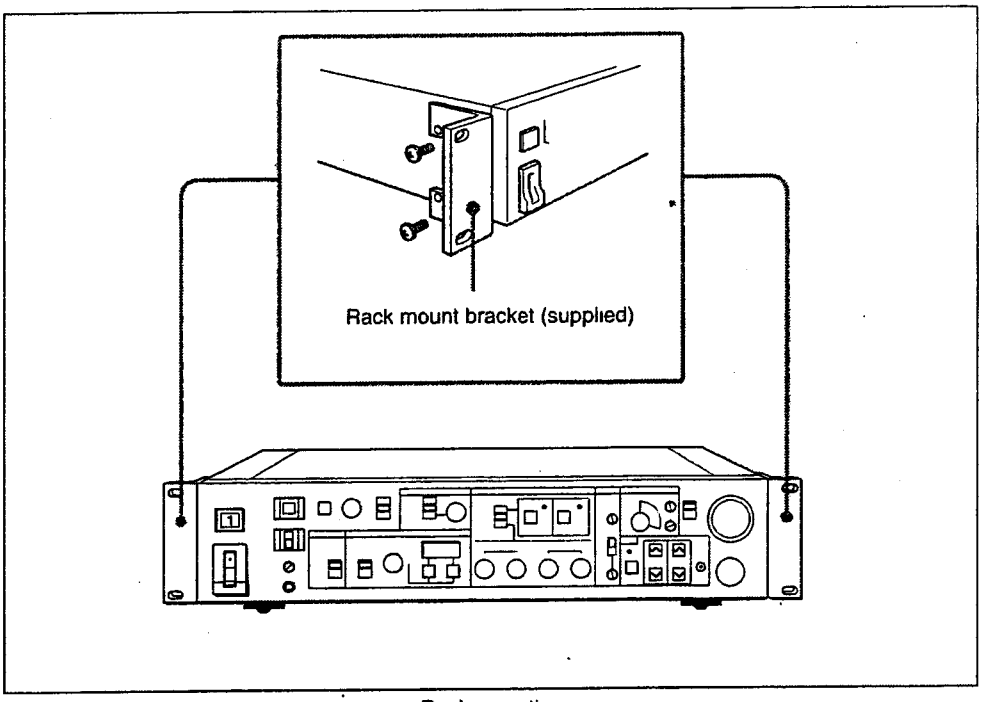
On transportation

Save the original carton and associated packing material.
They will be useful should you have to transport or ship the unit.

If you have any questions about this unit, contact your Sony dealer.

Rack Mounting

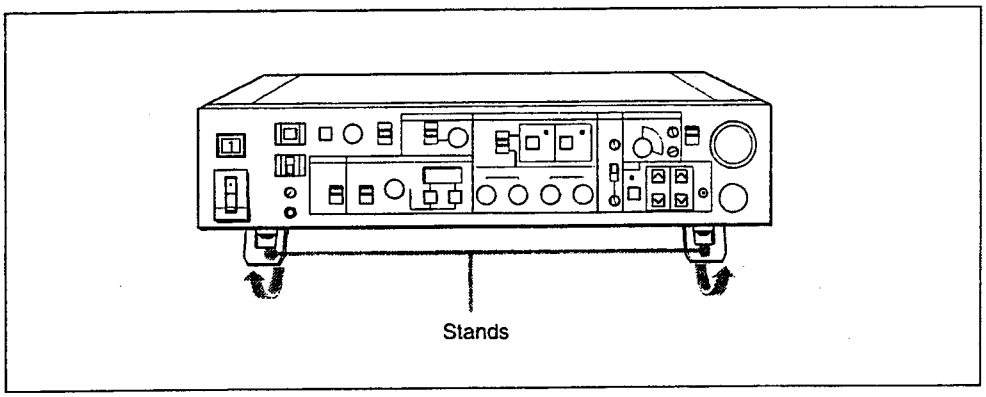
When the rack mount brackets (supplied) are attached to the CCU-M5/M5P, the unit can be mounted in a 19-inch standard rack.
For details on rack mounting, consult your Sony dealer.



Rack mounting

How to Use the Stands

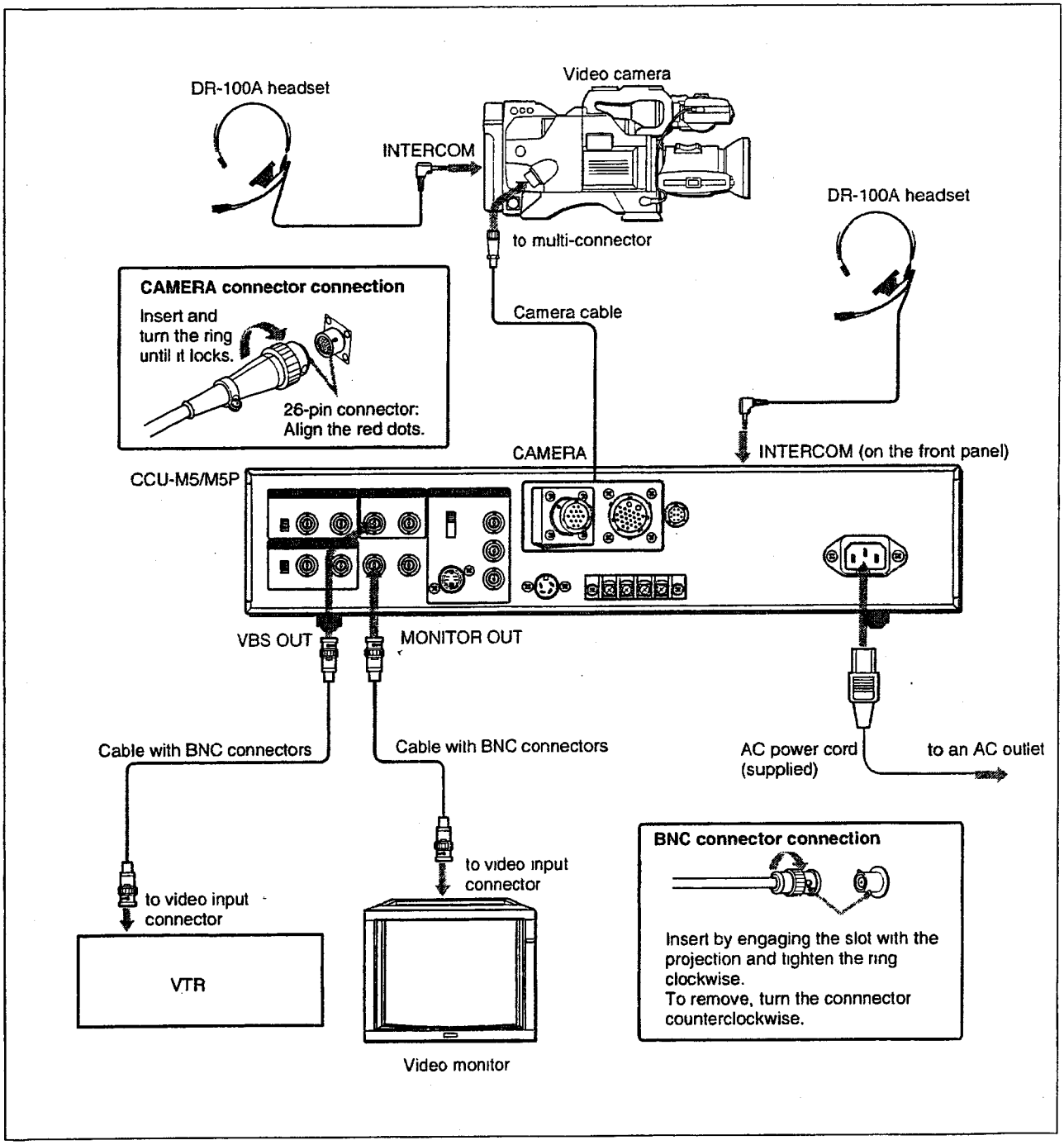
Stands are provided on the bottom of the CCU-M5/M5P. When the unit is used on a table, turning the stands as shown below will allow easy operation.



How to use the stands

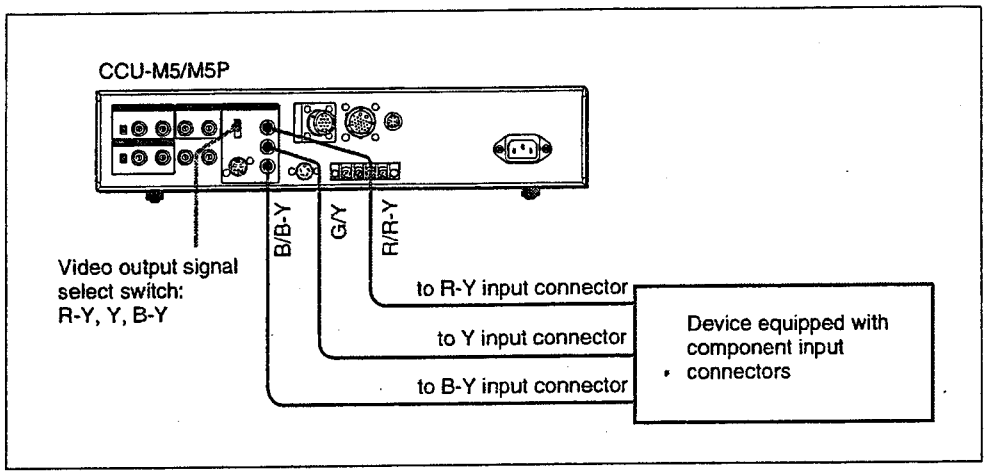
Connections

Connecting a Video Camera



Connection diagram

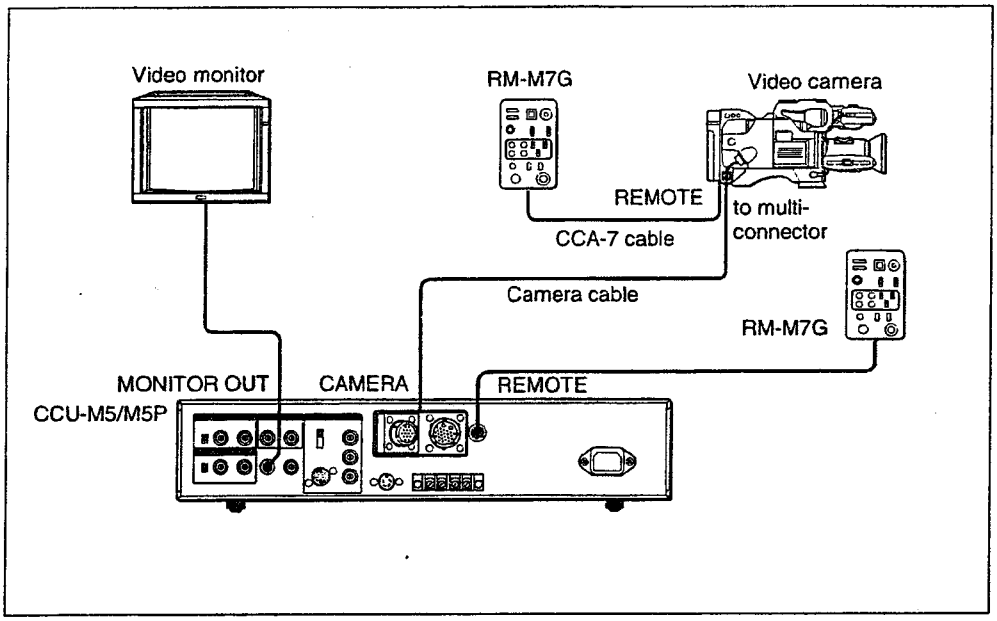
Connecting a device equipped with component input connectors



Connection with a device equipped with the component input connectors

Connecting an RM-M7G remote control unit

When an RM-M7G remote control unit is connected to the CCU-M5/M5P as illustrated below, you can control the video camera with the RM-M7G. The RM-M7G can be connected directly to the video camera.



Connection with the RM-M7G

To control a camera with the RM-M7G

When the power is turned on, the camera is controlled with the CCU-M5/M5P. To control the camera with the RM-M7G, proceed as follows:

1 Make the following preparations on the CCU-M5/M5P.
These cannot be adjusted from the RM-M7G.
- Set the video output signal select switch to the appropriate position according to the connected video equipment.
- Set the CABLE COMP switch according to the length of the cable.

2 Press the PANEL ACTIVE button on the RM-M7G.
Then the camera can be controlled with the RM-M7G through the CCU-M5/M5P.

To control the camera with the CCU-M5/M5P

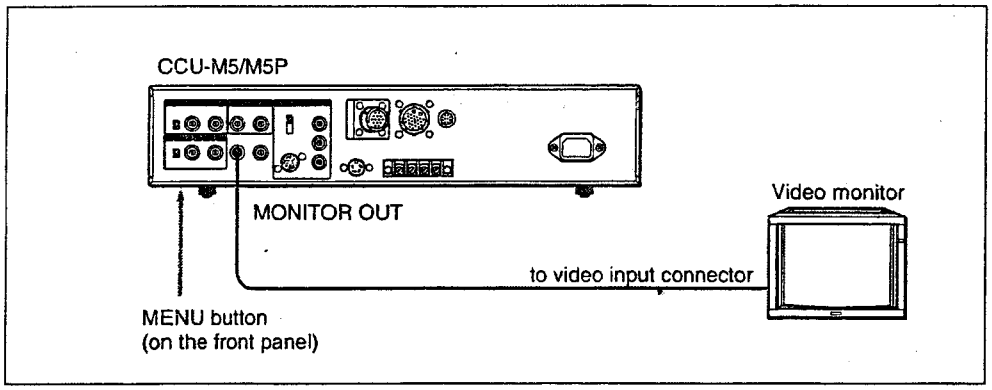
Press the PANEL ACTIVE button on the CCU-M5/M5P.

Notes

- The PANEL ACTIVE button on the RM-M7G may not function if you press it while you are turning a control on the CCU-M5/M5P. In such a case, stop turning the control, then press the PANEL ACTIVE button again.
- When the DXC-3000A/3000AP, DXC-325/325P, or DXC-930/930P is used, the RM-M7G cannot be connected to the CCU-M5/M5P.
- Set the CAMERA SELECT switch on the RM-M7G to "1".

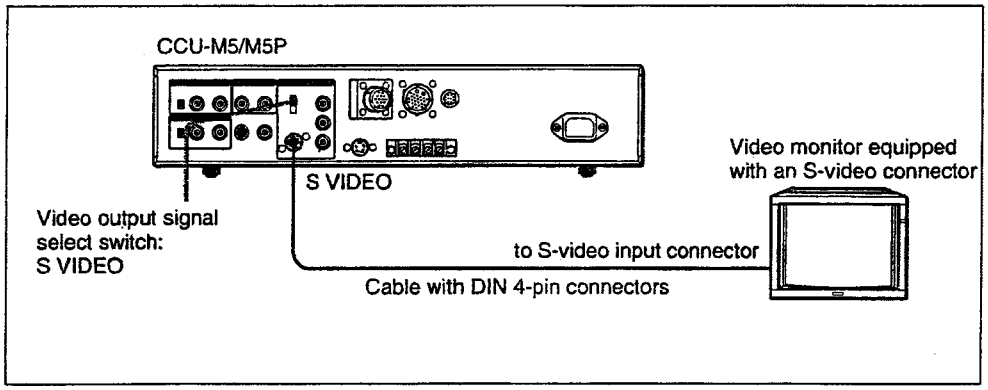
Connecting a video monitor

Monitoring a video and character signals



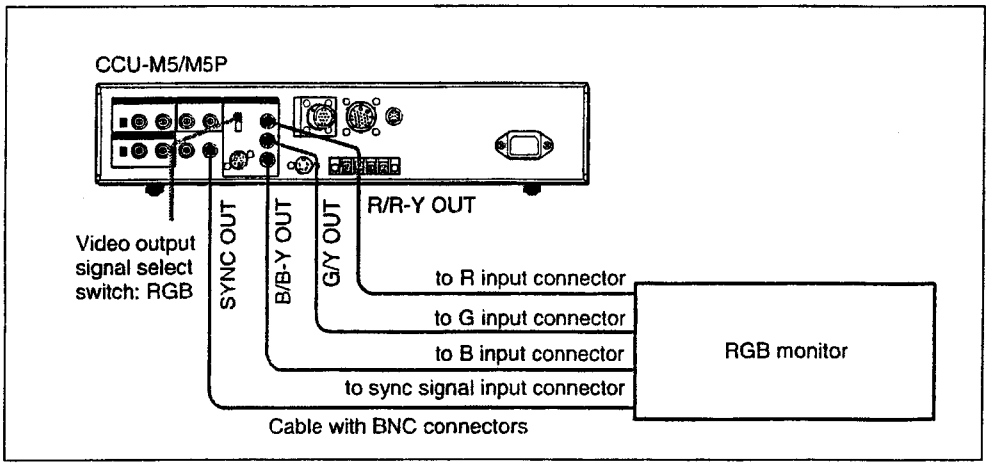
Mitoring a video and character signals

Connecting a video monitor equipped with a Y/C connector



Connecting a video monitor equipped with an S-video connetor

Connecting an RGB monitor

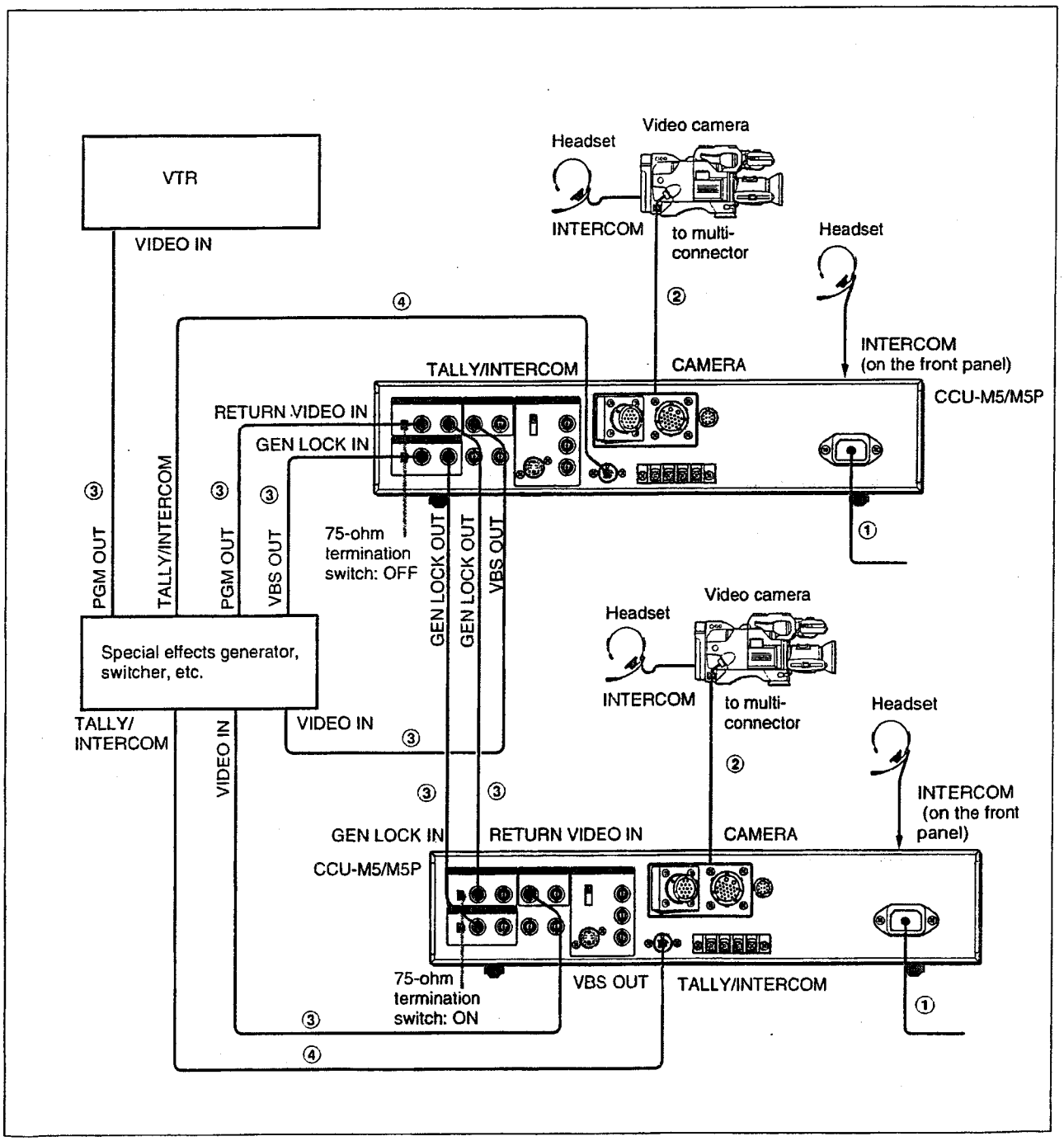


Connecting an RGB monitor

Connecting two or more video cameras

When two or more video cameras are to be used, connect them to the SEG-2550A/2550AP special effects generator, a switcher, etc. using the CCU-M5/M5P camera control units as illustrated below. In this configuration, special effects, such as switching, mixing, wiping, keying and color matting can be performed. Besides these effects, by connecting CRK-2000/2000P universal chroma keyer, you can obtain a wider variety of special effects.

For the actual set-up of a mulit-camera studio system, please consult your Sony dealer.



Connecting two or more cameras

Cables to be used

No. in the figure	Cable
①	AC power cord (supplied)
②	Camera cable (See "Length of camera cables.")
③	Cable with BNC connectors
④	Cable with DIN 4-pin connectors

Note on connecting two or more video cameras

When using two or more cameras, connections should be made so that all the cameras will lock to the same reference signal. As the IN and OUT connectors of the GEN LOCK connectors are directly connected in the unit, connect a reference signal to the GEN LOCK IN connector on a CCU, and connect the OUT connector of the CCU to the IN connector of the other CCU, and so forth. Then the same reference signal can be supplied to all the video cameras.
The IN and OUT of the RETURN VIDEO connectors are also connected in the unit so that the return video signal connected to a CCU can be supplied to the all cameras with the same connection as the reference signal.
When the OUT connectors of the GEN LOCK and RETURN VIDEO connectors are used, be sure to set the 75-ohm termination switch to the OFF position. When not used, set the switch to the ON position.

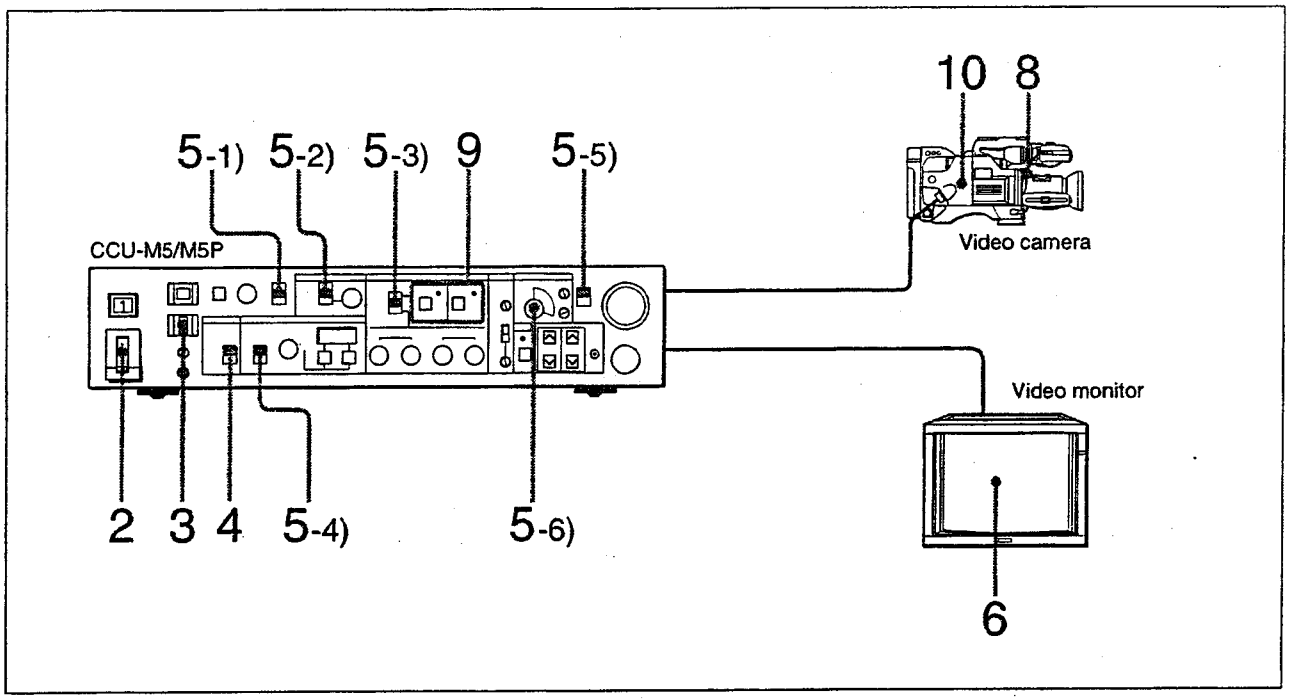
Note on connecting a return video signal

When a return video signal is input to the RETURN VIDEO IN connector, be sure to supply a sync signal to the GEN LOCK IN connector.

Basic Operation

Standard Settings and Operation

The standard settings and basic operating procedures when using a single camera are described here.



Basic operation

1 Turn the power to the connected equipment ON.

2 Press the ON side of the POWER switch.
The power is supplied, and the buttons and lamps on the front panel will light.

3 Set the LOCK switch to OFF.

4 Set the MODE switch to BARS.

5 Set the switches as follows (standard settings):
1) GAIN switch to 0
2) KNEE switch to PRESET
3) W/B BALANCE switch to AUTO
4) SHUTTER switch to OFF
5) IRIS MAN/AUTO switch to AUTO
6) CABLE COMP switch to the appropirate position

6 Adjust the color of the video monitor using the color bar signal.
See "Adjusting a Video Monitor" on page 28.

7 Set the MODE switch to CAMERA.

8 Select an appropriate filter with the FILTER selector on the camera.

9 Adjust the black balance and white balance.
See "Adjusting Black Balance and White Balance" on page 29.

10 Start shooting.

Adjust the gain, knee, iris, master pedestal, etc. if necessary.
For details on these adjustments, see "Adjustments."

When using two or more video cameras

After the making standard settings, adjust the H phase and SC phase of all the cameras before adjusting the color of the video monitor.
For details, see "Adjusting the SC and H Phases" on page 34.

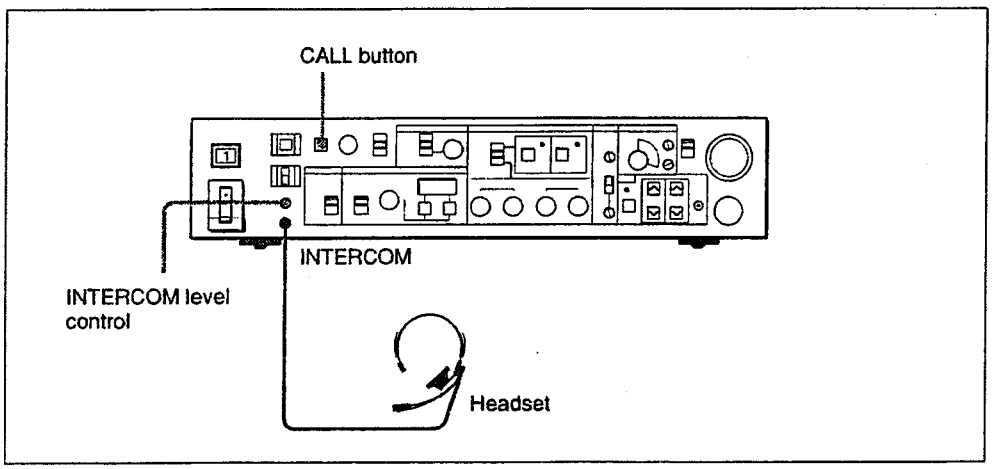
Lock function

When your adjustments are completed, it is recommended to set the LOCK switch to ON. Then the function of the switches, buttons and controls on the panel will be locked, and the setting conditions will be maintained. Under these conditions, the adjusted values are not changed even if a switch, button or other control knob is touched by mistake.
For readjustment or after shooting, set the LOCK switch to OFF.

Communication with a Camera Operator or Control Console Operator

When a DR-100A intercom headset (optional) is connected via the INTERCOM connector on the front panel, communication between the CCU and the camera is enabled. To notify the camera operator that the CCU operator wants to talk with him, press the CALL button on the CCU. The tally lamp in the viewfinder of the camera will light.

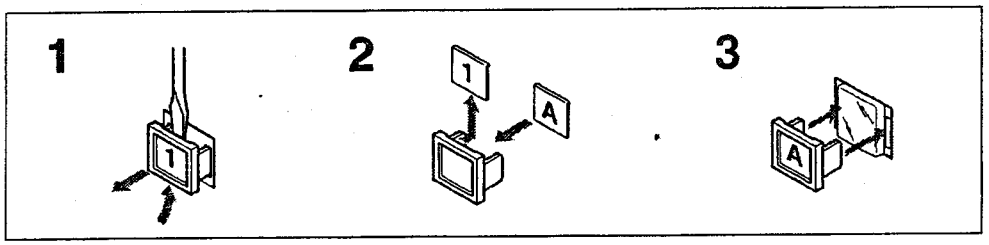
If the TALLY/INTERCOM connector or INTERCOM/TALLY connectors on the rear panel is/are connected to the intercom connector on the control console or special effects generator, or to the intercom system, communication with the operator of the connected equipment is also enabled.



Communication with the operator of connected equipment

Tally lamp

The tally lamp will light when a camera connected to the CCU is selected at the control console or the special effects generator, or when the CALL button of the CCU is pressed to call the camera operator.
The number or characters on the tally lamp can be changed using the number or character segments (supplied) as shown below.



Changing the number or characters on the tally lamp

1 Detach the tally indication using a screwdriver.

2 Change the number or characters with the supplied segment.

3 Attach the tally indication.

Return Video

When a program output connector on the control console is connected to the RETURN VIDEO IN connector, the return video signal (the signal selected at the control console) can be seen on the viewfinder screen by setting the VF VIDEO selector to AUTO and pressing the VTR START/RETURN VIDEO button on the camera.
When two or more cameras are used, the camera operators can check the final program output of the system.
Return video monitoring is possible in the camera's viewfinder, but is not on a video monitor connected to the CCU.

Note on the signal input to the RETURN VIDEO connector

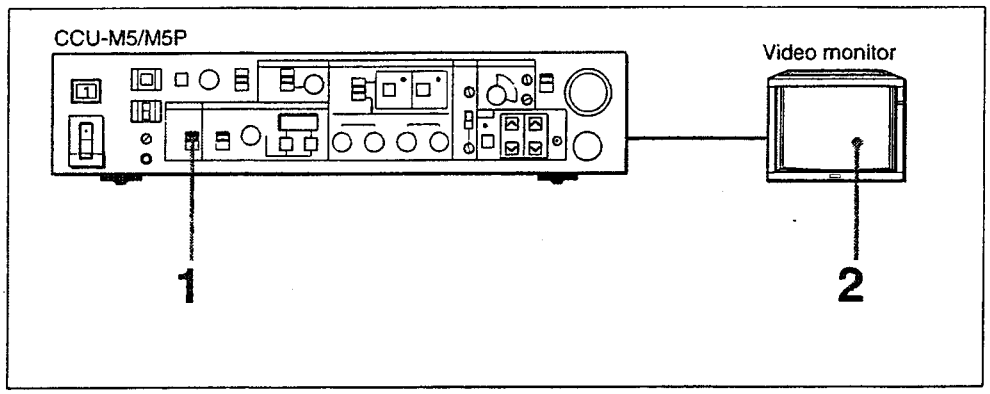
The signal input to the RETURN VIDEO IN connector should be synchronized with the signal input to the GEN LOCK IN connector. Otherwise synchronization of the camera may be unstable.

Note on connecting a return video signal
When a return video signal is input to the RETURN VIDEO IN connector, be sure to supply a sync signal to the GEN LOCK IN connector.

Adjustments

Adjusting a Video Monitor

When a color video monitor is used to monitor a picture, adjust the color of the monitor by using the color bar signal.
For details on adjustments, refer to the instruction manual furnished with the video camera.



Adjusting the video monitor

1 Set the MODE switch to BARS.

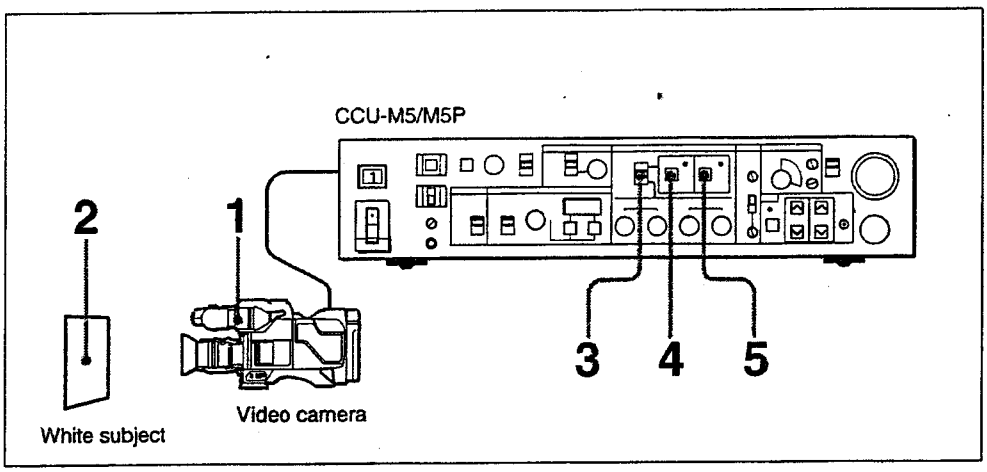
2 Adjust the color and hue controls on the monitor.

3 Set the MODE switch to CAMERA after your adjustments are completed.

Adjusting Black Balance and White Balance

The black balance and white balance should be correctly adjusted to obtain lifelike color reproduction and a clear picture. The adjustments should be made under the same lighting conditions as those under which you will be shooting.

Automatic adjustment



Automatic black balance and white balance adjustment

1 Set the FILTER selector of the camera to the position corresponding to the lighting conditions.

2 Point the camera at a white subject (white wall, white paper, etc.) and zoom ip on it.
For details, refer to the instruction manual for the video camera.

3 Set the W/B BALANCE switch to AUTO.

4 Press the BLACK button.
The black balance is automatically adjusted, and the lamp associated with the BLACK button lights for about 5 seconds, then goes out.

5 Press the WHITE button.
The white balance is automatically adjusted, and the lamp associated with the WHITE button lights for about 5 seconds, then goes out.

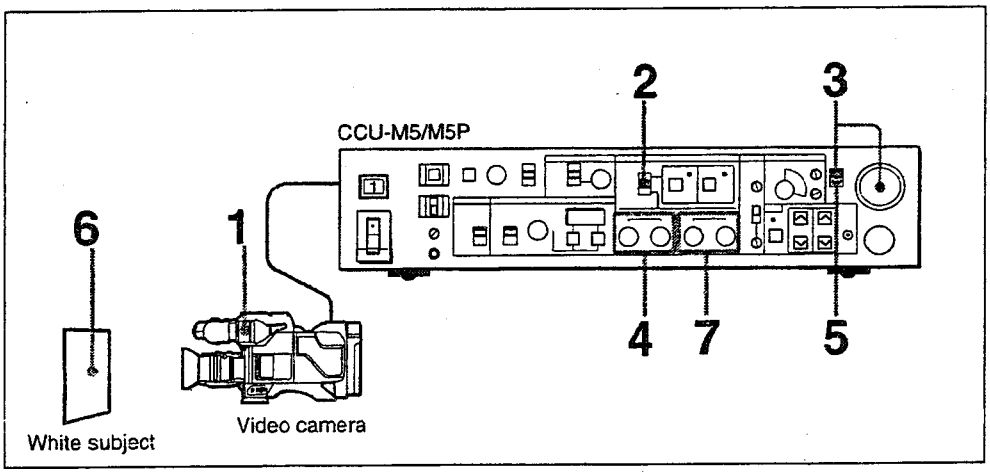
Notes

- When the lighting conditions of the subject are changed, adjust the white balance only. Readjustment of the black balance is not required.
- If the lamp does not light within about ten seconds after pressing the BLACK or WHITE button, press the button again.
- If the lamp associated with the WHITE button blinks, check the camera's viewfinder screen to determine the cause. Change the FILTER selector setting of the camera, they try the white balance adjustment again.

  AUTO WHITE : NG
  :LOW LIGHT
  TRY AGAIN

Manual adjustment

For precise adjustment, it is recommended to use a waveform monitor and a vectorscope.



Manual white balance and black balance adjustment

1 Set the filter selector of the camera to the position corresponding to the lighting conditions.

2 Set the W/B BALANCE switch to MANUAL.

3 Close the iris.

4 Turn the PED controls to adjust the black balance.
Adjust the balance so that the monitor screen goes black.
Turn the control while monitoring the waveform.

5 Set the iris to the automatic adjustment mode.

6 Point the camera at a white subject (white wall, white paper, etc.) and zoom in on it.

7 Turn the GAIN controls to adjust the white balance.
Adjust the balance so that the white subject appears white on the color monitor screen.
Turn the controls while monitoring the waveform.

Painting

Using the GAIN and PED controls, a picture can be colored to obtain special effects. For example, a picture can be made reddish to indicate a sunset or bluish to show early morning. This is called "painting."
Monitoring the picture on the color monitor screen, turn the GAIN and PED controls until the desired coloring is obtained.

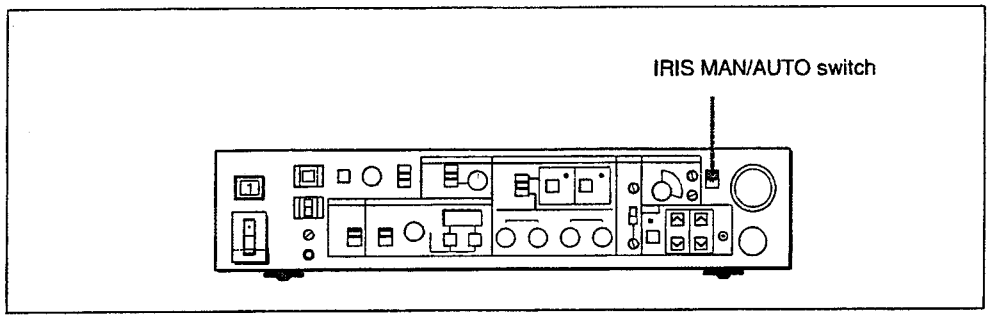
To start recording without adjusting the white balance

Set the FILTER selector on the camera to the appropriate position, and set the W/B BALANCE switch to PRESET. An approximate balance will be obtained.

Adjusting the Iris

Be sure to set the IRIS selector on the lens unit to AUTO.

Automatic adjustment

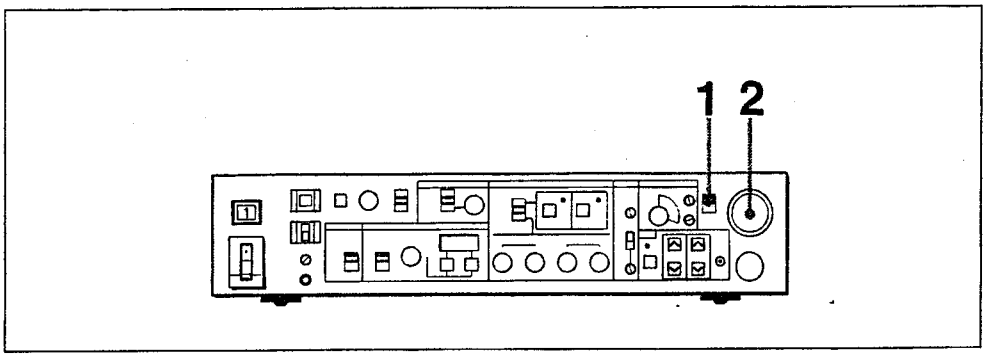


Automatic iris adjustment

Set the IRIS MAN/AUTO switch to AUTO.
The iris will be automatically adjusted according to the brightness of the subject.
You can precisely adjust the iris in automatic iris mode by turning the IRIS control.

Manual adjustment

Manual adjustment may be more effective when recording an object against a bright sky or a scene with high contrast.



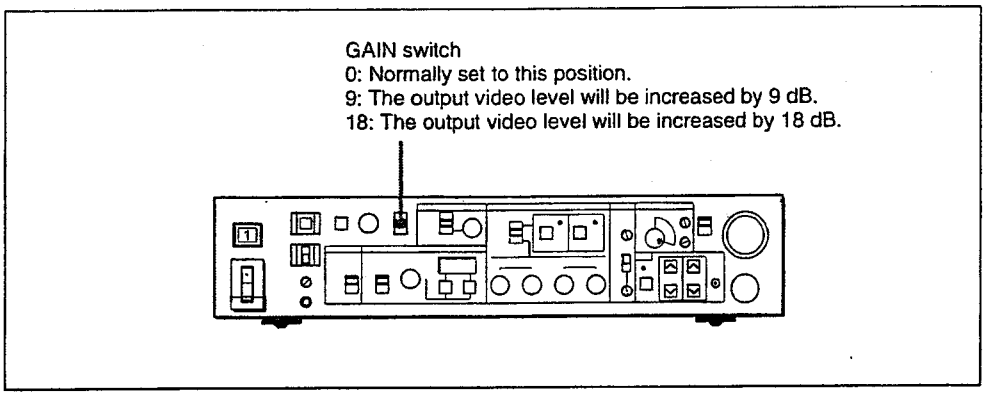
Manual iris adjustment

1 Set the IRIS MAN/AUTO switch to MAN.

2 Turn the IRIS control to adjust the iris.

Adjusting the Video Gain

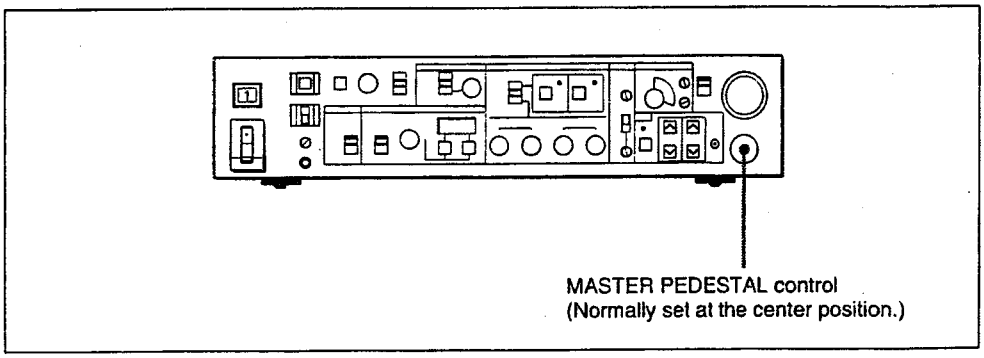
If a clear picture cannot be obtained because of insufficient lighting, raise the video output using the GAIN switch.


GAIN switch
0: Normally set to this position.
9: The output video level will be increased by 9 dB.
18: The output video level will be increased by 18 dB.

Video gain adjustment

Adjusting the Master Pedestal Level

When the details of the dark parts of a picture cannot be reproduced in detail, adjust the master pedestal level with the MASTER PEDESTAL control.
Use of a waveform monitor is recommended for easier adjustment.



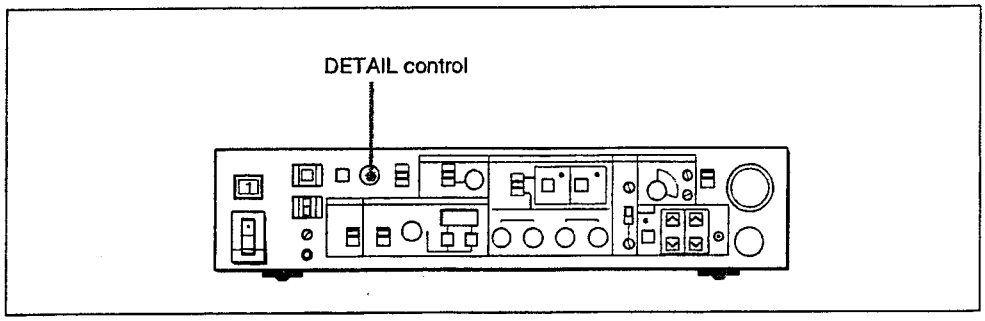
Master pedestal level adjustment

Memorizing the adjusted value

The adjusted value of the master pedestal level normally cannot be stored in memory. However when a DXC-M7/M7P video camera is connected, it can be stored in memory by resetting the internal switch of the camera.
For details, refer to the instruction manual for the video camera.

Adjusting the Details

The contours of a picture can be changed using the DETAIL control.



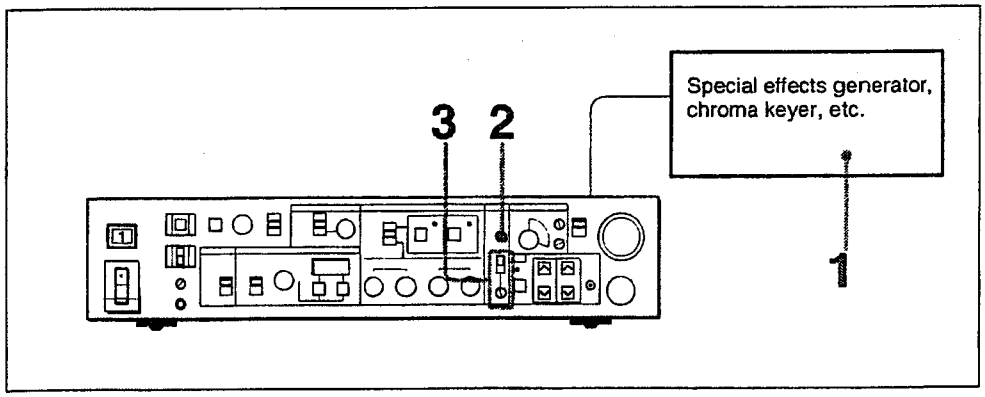
Detail adjustment

Adjusting the SC and H Phases

When two or more cameras are used, all cameras should be adjusted so that the picture tone of all cameras will be the same. Supply the same reference signal to all the cameras, and proceed as follows.

If the phase check indication is available

If the CCU-M5/M5Ps are connected to a special effects generator such as the SEG-2550A/2550AP or the CRK-2000/2000P universal chroma keyer, the phase check indication is available.



Adjusting the SC and H phases

1 Set the PHASE INDICATION switch on the connected special effects generator or chroma keyer to ON.

2 Adjust the horizontal phase by turning the H PHASE control on the CCU-M5/M5P.

3 Adjust the subcarrier phase by using the SC PHASE switch and controls of the CCU-M5/M5P.

For details, refer to the instruction manual for the special effects generator or chroma keyer.

If the phase check indication is not available

Pick one camera as the reference camera and adjust all other cameras to it. For example, if Camera 1 is picked as the reference camera, first precisely adjust Camera 1 to obtain the best possible picture, and then adjust the picture of Camera 2 to Camera 1, the picture of Camera 3 to Camera 1, and so on.

Adjusting the H phase

Adjust the horizontal sync signal phase of the output signal so that the phases of the reference signal and output signal become the same. Use of a waveform monitor or an oscilloscope is recommended for easier adjustment.

Adjusting the SC phase

Adjust the subcarrier phase of the output signal so that the phases of the reference signal and output signal become the same. It is recommended to use a vectorscope, or to display the same pictures on the upper and lower (or right and left) halves of the video monitor screen by using the wipe function of the special effects generator for easier adjustment.

For details, refer to the instruction manual for the special effects generator, etc.

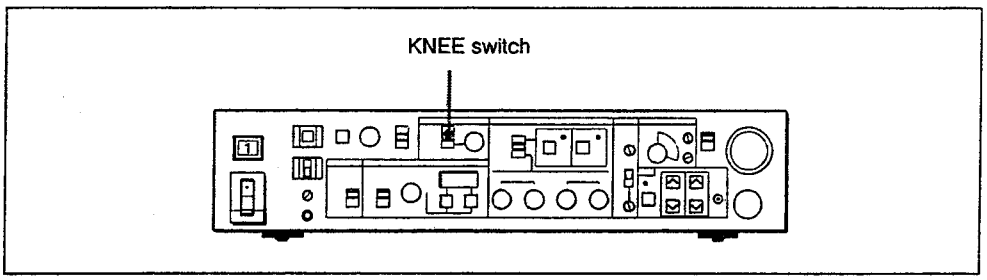
Adjusting the Knee

When recording a scene with high contrast or with bright light, adjust the knee point to reproduce the bright parts of the picture clearly.
Normally set the KNEE switch to PRESET, and the factory-set standard knee point can then be obtained.

Note

The KNEE adjustment function is activated only when the DXC-M7/M7P video camera is connected.

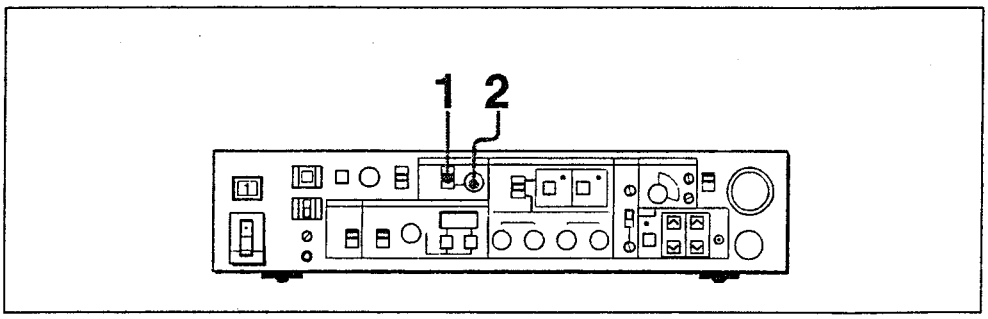
Automatic adjustment



Automatic knee adjustment

Set the KNEE switch to AUTO. The proper knee point is set according to the brightness of the subject to obtain the best possible picture.

Manual adjustment



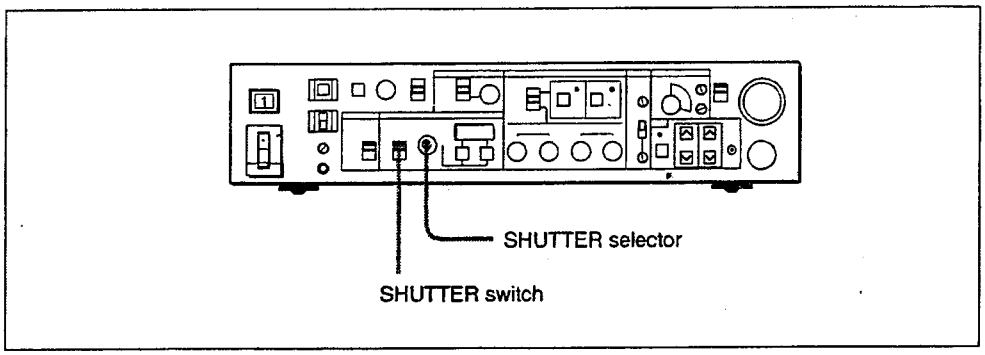
Manual knee adjustment

1 Set the KNEE switch to MANUAL.

2 Turn the KNEE control.

Selecting the Shutter Speed

Normally set the SHUTTER switch to OFF. Then normal shooting is done.
To shoot a subject moving at high speeds clearly, or to obtain a strobe effect, a still picture, a slow motion, etc., select the appropriate shutter speed with the SHUTTER selector.



Shutter speed selection

SHUTTER selector setting

SHUTTER selector setting	Shutter speed
1	1/100 sec. for the NTSC model, 1/60 sec. for the PAL model [a]
2	1/250 sec.
3	1/500 sec.
4	1/1000 sec.
5	1/2000 sec.

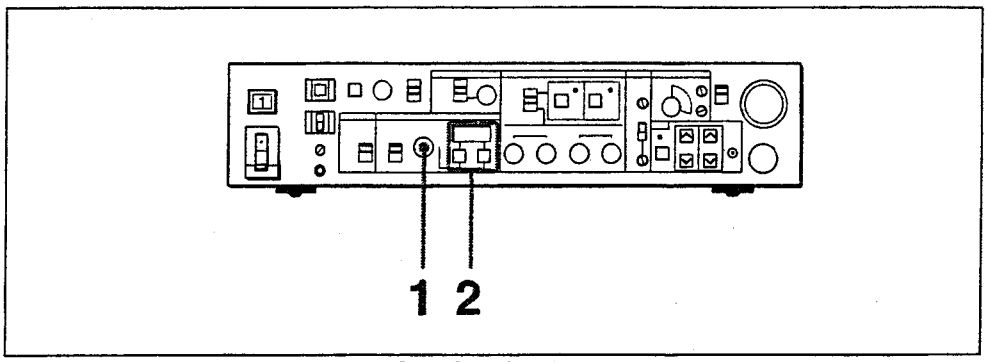
a) When shooting under a fluorescent lamp in the area of power frequency 50 Hz (for the NTSC model) or 60 Hz (for the PAL model), use this setting. Then flicker can be reduced.

Decreasing Slant Noise from a Computer Screen (Clear Scan Function)

The Clear Scan function decreases the slant noise when you are shooting a computer screen using the video camera.

Note

The Clear Scan function is activated only when the DXC-930/930P video camera is connected.



Clear Scan function

1 Set the SHUTTER control to C.SCAN.

2 Press the C.SCAN button to obtain the least slant noise while monitoring the picture on the screen.
The adjusted value appears on the display.

When the SHUTTER switch is set to ON, the adjusted value is stored in memory, and retained even when the power is turned off.

Compensating for the Cable Length

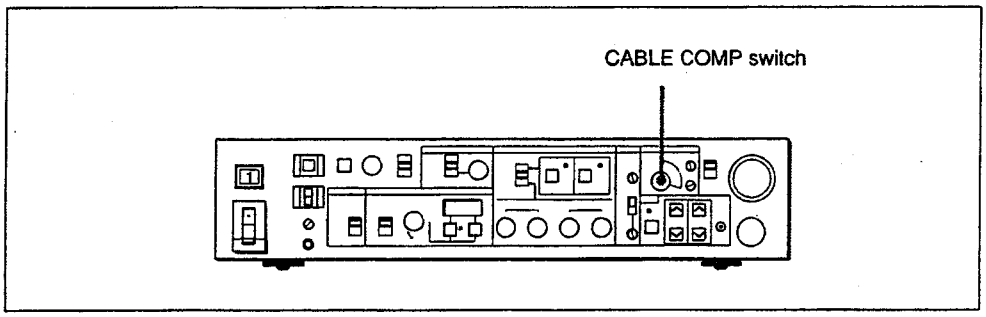
Coarse adjustment

Set the CABLE COMP selector to the appropriate position according to the length of the cable which connects the video camera to the CCU-M5/M5P. The transmission loss from high-frequency components or the output level decrease caused by the cable extension can be compensated for up to 300 meters. The maximum cable length to be compensated for depends on the type of a cable and the equipment used in combination.

For details, see "Functions Using the CCU-M5/M5P."

Note

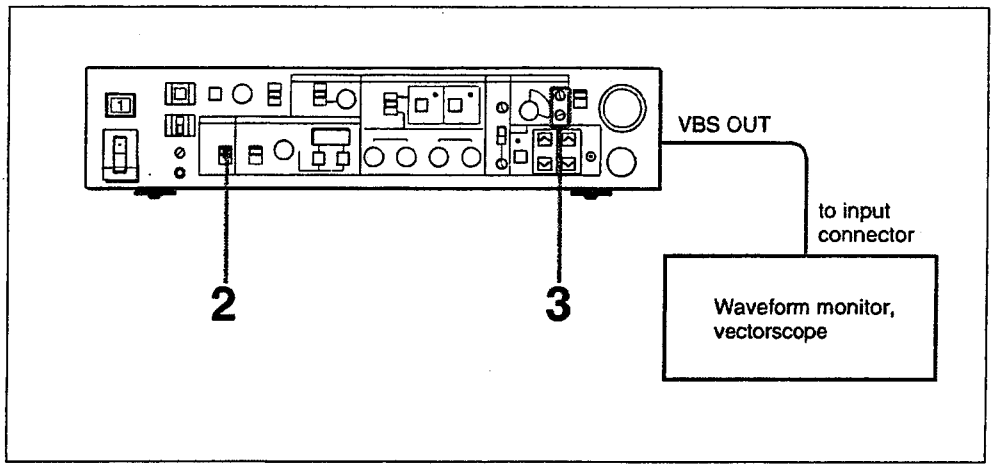
When the cable length to be used is less than ten meters, set the CABLE COMP selector to 25 and perform fine adjustment with the CABLE COMP FINE controls.



Coarse cable compensation

Fine adjustment

The signal fed from the VBS OUT connector can be compensated precisely with the CABLE COMP FINE adjustment screws. Using the Y and C controls, the luminance and chrominance signals can be compensated separately. Use of a waveform monitor or vectorscope is recommended for fine adjustment.



Fine cable compensation

1 Connect the VBS OUT connector to the input connector of a waveform monitor or a vectorscope.

2 Set the MODE switch to BARS.

3 Adjust the luminance and chrominance level while monitoring the waveform monitor.

Adjusting the luminance level

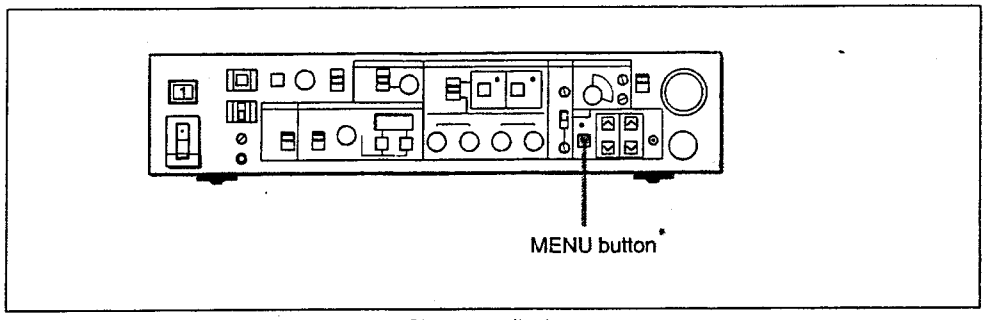
Turn the Y control until the luminance level reaches the specified level.

Adjusting the chrominance level

Turn the C adjustment screw until the burst level reaches the specified level. When a vectorscope is connected, turn the C control so that the vector matches the "⊞" mark position on the vectorscope screen.

Auxiliary Operation

Display adjusted value



Character display

Press the MENU button of the AUX operation functions, and the current setting on the panel appears on the screen of the video monitor connected to the MONITOR OUT connector.
When the DXC-930/930P video camera is connected, the current setting appears if the MENU button is pressed twice.

To clear the displayed characters

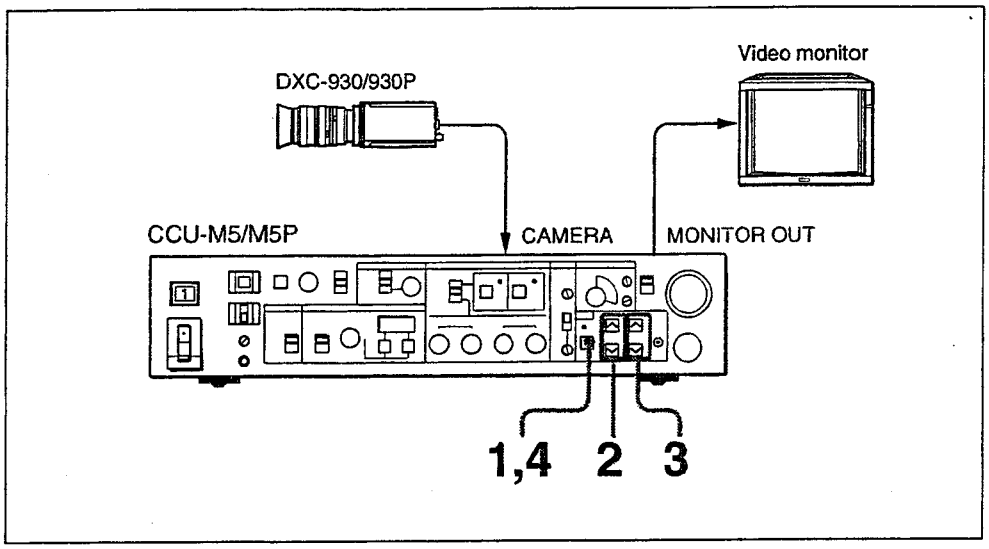
Press the MENU button again

Auxiliary operation

When the DXC-930/930P is connected to the CCU-M5/M5P, the items not provided on the CCU-M5/M5P can be adjusted using the buttons of the AUX operation functions. Connect a video monitor to the MONITOR OUT connector, and the items and setting status which can be adjusted will appear on the monitor screen.

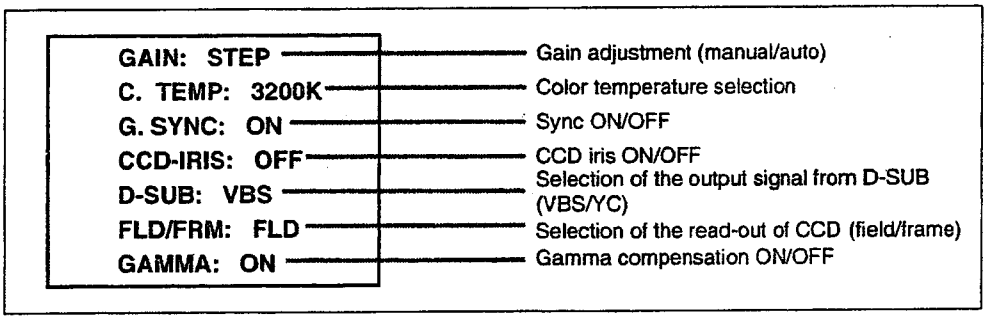
Note

The FUNCTION, DATA, and RESET buttons of the AUX operation functions are activated only with the DXC-930/930P video camera connected.



AUX operation

1 Press the MENU button
The MENU lamp lights up, and the following menu appears on the monitor screen.



Menu

2 Press the FUNCTION buttons until the arrow moves to the item whose setting is to be changed.

3 Press the DATA buttons until the desired setting for the selected item is obtained.

4 Press the MENU button.
The MENU lamp goes out, and the auxiliary operation mode is terminated. On the monitor screen, the current setting on the panel appears.

5 Press the MENU button again.
The displayed characters disappear, and the camera picture is displayed.

The settings are stored on an EEPROM and are retained even if the power is turned off.

To retrieve the standard settings

Press the RESET button while the menu is displayed on the monitor screen. The settings of the displayed items are returned to the standard settings (as set at the factory).

Specifications

General

Power requirement	CCU-M5: 120 V AC±10%, 50/60 Hz CCU-M5P: 220 to 240 V AC±10%, 50/60 Hz
Power consumption	54 W
Operating temperature	5°C to 40°C (41°F to 105°F)
Storage temperature	–20°C to +55°C (–4°F to +131°F)
Dimensions	424 × 88 × 283 mm (w/h/d) (16 3/4 × 3 1/2 × 11 1/4 inches) not including projecting parts and controls
Mass	About 5.9 kg (13 lb)

Output connectors

VBS OUT 1, 2	BNC type (1 in each) VBS: 1.0 Vp-p, sync negative, 75 ohms, unbalanced
S VIDEO OUT	Mini DIN 4-pin (1) Y: 1.0 Vp-p, sync negative, 75 ohms, unbalanced C: burst level 0.286 Vp-p (NTSC) or 0.3 Vp-p (PAL), without sync
R/R-Y, G/Y, B/B-Y OUT	BNC type (1 in each) (selectable) R, G, B: 0.7 Vp-p, 75 ohms Y: 1.0 Vp-p, sync negative, 75 ohms, unbalanced R-Y, B-Y: 0.7 Vp-p (NTSC) or 0.525 Vp-p (PAL), without sync, 75 ohms unbalanced
SYNC OUT	BNC type (1) 4 Vp-p, 75 ohms, negative
MONITOR OUT	BNC type (1) VBS: 1.0 Vp-p, sync negative, 75 ohms, unbalanced

Input/output connectors

GEN LOCK IN/OUT	BNC type (1 in each) VBS (1.0 Vp-p) or black burst (0.45 Vp-p) with loop-through function, with 75-ohm termination switch
CAMERA	26-pin and 14-pin (1 in each)
TALLY/INTERCOM	DIN 4-pin (1)
INTERCOM/TALLY	Screw terminals (1 set)
REMOTE	10-pin (1)
RETURN VIDEO IN/OUT	BNC type (1 in each) VBS (1.0 Vp-p), with loop-through function, with 75-ohm termination switch

Specifications

Control items

Iris	Auto, manual
White balance	Auto, manual, preset, R, B gain
Black balance	Auto, manual, R, B pedestal
Video gain	
Master pedestal level	
Knee point	Auto, manual, preset
Detail	
Electric shutter	
Clear scan	
Mode	Camera, color bars
Tally/intercom	Level adjustment
SC phase	
H phase	
Cable compensation	

Supplied accessories

Rack mount bracket (2)
Screws (4)
AC power cord (1)
Tally indication segments (1 set)
Operating instructions (1)

Design and specifications are subject to change without notice.

Recommended Equipment

Video camera

DXC-325/325P, DXC-327/327P, DXC-327A/327AP, DXC-537/537P, DXC-930/930P, DXC-3000A/3000AP, DXC-M7/M7P,

VTR/disk recorder/printer

Video cassette recorder VO-8800/8800P, PVW-2800/2800P
Color video printer UP-5100/5000P
Laser videodisk recorder LVR-5000A/LVS-5000A, LVR-6000A/LVS-6000AP

Video equipment for a studio system

Remote control unit RM-M7G
Special effects generator SEG-2550A/2550AP
Headset DR-100A
Camera cable
CCZ-A2 (2m), CCZ-A5 (5m), CCZ-A10 (10m), CCZ-A25 (25m),
CCZ-A50 (50m), CCZ-A100 (100m),
CCQ-10AM (10 m), CCQ-25AM (25 m), CCQ-50AM (50 m),
CCQ-100AM (100 m)
CCTZ-3RGB (3m), CCTZ-3YC (3 m),
CCTQ-3RGB (3 m, for DXC-930/930P video camera)
CCZ-A cable extension adaptor CCZZ-1B, CCZZ-1E
Tally/intercom cable CCDD-2.5